DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON, DC 20332-5000

REPLY TO
ATTN OF: LEED

SUBJECT: Engineering Technical Letter (ETL) 90-2:
General Policy for Prewired Workstations and Systems Furniture

TO: See Distribution List:

1. Purpose: This ETL:

a. Provides overall policy on prewired workstations and systems furniture. This ETL supercedes ETL #86-12: Prewired Workstations and Systems Furniture, 3 July 1986.

b. This ETL is authorized in accordance with AFR 8-7, Air Force Engineering Technical Letters (ETL) dated 9 January 1986 and is to be implemented accordingly. Waivers will be processed in accordance with the procedures establis by the Model Installation Program.

2. Effective date: Immediately.

3. Referenced Publications:

a. AFR 20-14, Management of Government Property in Possession of t Air Force

b. AFR 21-20, Standard Filing Equipment

c. AFR 85-10, Operation and Maintenance of Real Property

d. AFR 86-2, Chapter 13, Administrative Space Criteria

e. AFM 88-4, Chapter 9, Raised Floor Systems

f. ETL 88-10, Prewired Workstation Guide Specification

g. AFM 88-15, Criteria and Standards for Air Force

h. AFP 88-26, Construction of Security Conference Rooms.

i. AFP 88-40, Sign Standards

j. AFP 88 -41, Interior Design Guide

k. AFR 89-1, IMC 81-1, Chapter 18, Comprehensive Interior Design Services

l. AFM 171-285, Program, Design Construction Systems: F044/JG, Users/Operations Manual

4. Description/Implementation: This ETL contains guidance on the general use of prewired workstations and systems furniture. It is to be used in conjunction with 88-10: Prewired Workstations Guide Specifications and ETL 89-04: Systems Furnitur Guide Specifications when developing projects.

5. The action officer for this ETL is Ms. Janice A. Nielson, AF/LEEDF, Autovon 29 6247.

3 Atchs
1. Distribution List
2. Policy
3. ETL Index

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GENERAL POLICY FOR PREWIRED WORKSTATIONS AND SYSTEMS FURNITURE

TABLE OF CONTENTS

Atch 2

SECTION 1 GENERAL

1.0 Systems furniture and prewired workstations are used in both administrative and industrial facilities. Bases may desire to use a single manufacturer in similar facilities throughout the base for continuity. The same manufacturer should be used throughout a single facility.

1.1 Prewired workstations (PW) shall be included as part the construction requirements for all (MILCON) administrative areas of any new MILCON facility or MILCON alteration of an existing facility when the administrative area contains at least 1,000 square feet of contiguous net office area. Prewired workstations and the items identified in Enclosure 1, shall be part of the construction bid documents.

1.2 Specialized industrial prewired workstations may be included as part of the construction requirements for all industrial type facilities where appropriate. Specialized PW have water lines, gas lines, antistatic and/or chemically treated worksurfaces, intensified task lighting, assembly line capabilities, parts storage, etc., in addition to the general workstation components. These stations are designed for laboratory, medical, maintenance and training facilities.

1.3 Systems furniture may be designed for existing administrative facilities in conjunction with operations maintenance (O&M) projects.

1.4 Specialized (industrial) systems furniture may be considered in the appropriate areas for existing industrial facilities when renovating such facilities (laboratories, medical, maintenance and training).

1.5 All prewired workstations must be selected in conjunction with a comprehensive interior design (CID) project for the facility. When providing CID services, the following requirements must be satisfied.

l.5.l The CID services must be provided as part of the architect-engineer (A-E) design contract for the facility.

1.5.2 The requirement for CID services must be included in the Commerce Business Daily advertisement for A-E services or comparable announcements for overseas areas.

1.5.3 If possible, retain original designers throughout the entire acquisition and installation phases for design modifications, submittal approvals and installation modifications.

1.6 All systems furniture should be designed by a qualified interior designer or systems furniture space planner. In most

cases modification to the facilities will be required in addition to the furniture layouts and specifications, when facility modifications are required, a CID project should accompany the overall design.

1.7 Existing assets (systems furniture/prewired workstations) should be utilized or matched, when additions are required, to the maximum extent possible. Assets must be in good working condition, and remain within the facility in which they are being used.

SECTION 2 DEFINITIONS

2.1 Administrative Support Space. Areas usually required in a typical administrative office such as space for central files, conferences, storage, mail handling and reproduction.

2.2 Add-ons. Additional components to existing workstations, or 15 or less additional workstations, to an existing installation.

2.3 Automatic Data Processing (ADP) furniture. Similar to modular furniture where all work surfaces are floor-supported. Also referred to as electronic data processing (EDP) furniture.

2.4 Comprehensive Interior Design (CID) Services. Includes Structural Interior Design (SID) services plus the selection of furnishings, preparation of furniture placement plans, specifications and cost estimates.

2.5 Gross Floor Area. Computed to the outside of the enclosure walls of the building. (See paragraph 2-3, AFM 86-2, Standard Facility Requirements).

2.6 Manned Workstation. Workstation which will be occupied and used as an individual's primary work place. This applies whether the individual is a full-time or part-time employee or on a reserve or temporary assignment.

2.7 Modular Furniture. Similar to systems furniture except that all work surfaces are floor-supported. Modular furniture is funded with O&M funds and is considered conventional type furniture.

2.8 Net Floor Area. The total area in the building, less space taken up by outside walls, interior partitions, stair towers, elevator shafts, toilets, basements unsuited for office use, permanent hallways and corridors, machinery or equipment used for heating or ventilating the building, machinery or equipment used for furnishing light and power for building, water supply equipment and elevator machinery.

2.9 Net Office Area. The net floor area less administrative support space as defined below and other miscellaneous rooms not used directly as office space. Consist of net workstations areas plus corridor circulation.

2.10 Net Office Workstation Area. Net office area used for an individual workstation. The net workstation area is measured to the centerlines of surrounding panels, the face of any fixed walls defining the workstation and the lines between the workstation and any corridor circulation space between workstations.

2.11 Prewired Workstation. Prewired workstations consist of acoustical panels and components which are panel-connected and panel supported to form complete individual offices (work areas). The panels contain building utilities such as electrical wiring, convenience outlets, hook ups for computer equipment and communication wiring. The panels come in a variety of heights and widths. Components are attached to the panels and include work surfaces, shelving, lateral files, drawers, accessories and task/ambient lighting for the work surfaces and one ergonomic chair per workstation. Prewired workstations installed in MILCON facilities are funded as part of the construction contract using 3300 funds (See Atch 1).

2.12 Special Purpose Space. This term is used to describe special purpose rooms which may be required to meet special administrative needs: for example, electronic, small auditoriums, training rooms, drafting rooms housing data processing (DP) equipment and holding space for contract maintenance equipment. This space may be included in an administrative facility when justified by operational requirements. These areas are not included in the calculation of net floor and net office area per building occupant, therefore, there are no specific space limitations. Do not include DP space that may be properly reported under item 610-711, Data Processing Installation.

2.13 Structural Interior Design (SID) Services. Includes (1) finish schedule, (2) design and/or selection of decorative building surfaces, (3) floor coverings, (4) window coverings other than drapery, (5) built-in furniture and similar items which are integral to, or attached to the structure, (6) preparation of presentation boards showing material and color samples for the purpose of obtaining approval of the scheme, (7) determination of functional relations, (8) preliminary furniture placement plans, (9) consultation as required for revision of selections, and (10) final sample approvals.

2.14 Systems Furniture. Same as prewired workstations except installed in existing facilities and O&M 3400 funds are used for acquisition and installation. (See Atch 1).

2.15 Unmanned Workstation. A workstation will be occupied and used as a part-time basis or as an individual's secondary place of work. Examples would be workstations used for printers or other ADP equipment which are shared by a number of individuals on a temporary and short-term basis. Even though an unmanned workstation may be used temporarily, provide sufficient space and sufficient privacy to permit the individual using the workstation to accomplish the work.

2.16 Workstations: Term used when either prewired workstations or systems furniture is applicable.

SECTION 3 FUNDING

3.1 Prewired workstations shall be funded with MILCON 3300 funds.

3.2 Systems furniture shall be funded with O&M 3400 funds.

3.3 Nonappropriated funds may be used to purchase either prewired workstation or systems furniture.

3.4 Unit costs for the acquisition and installation for workstations shall be in accordance with guidance issued by AF/LEEP and AF/LEED.

3.5 Design fees. Are paid with P-313 design funds for MILCON projects and EEIC-532 O&M funds for maintenance, repair, and minor construction projects.

SECTION 4 PROGRAMMING

4.1 Prewired work stations are identified by the Base/MAJCOM for MILCON programs. Costs of the prewired work station will be included on the DOD Form 1391, Military Construction Data as part of the primary item cost in block (9) Cost Estimates. The term "prewired workstations" will be mentioned in block (12) Description. No separate prewired workstation cost is to appear on the DD Form 1391 but is to be shown in the project book (part A).

4.2 Systems furniture requirements for O&M projects are identified by Base/MAJCOM. DD Form 1391 and project book for O&M projects are to follow the same rules as for MILCON projects outlined above.

4.3 The administrative (prewired or systems) area of facilities with workstations shall be programmed at an average of 135 square feet per person gross floor area. This includes 115 square feet per person for the workstation and an additional 20 square feet per person for administrative support space where justified.

4.4 Additional space may be justified for special purposes as defined in Section 2.

4.5 For each MILCON project that includes purchase of conventional furnishings with O&M 3400 funds shall identify on the DD Form 1391 under other funds required and in the RAMP under CID requirements, the amount and FY in which the funds are programmed.

4.6 MILCON: All prewired workstations will be tracked in the PDC information systems. Reference AFM 171-285. Estimated and actual costs of the prewired workstations are to be entered on screen "ZPDSCLC", Comprehensive Interior Design. All project documents are to be kept by the BCE for accountability.

SECTION 5 WAIVERS

5.0 Waivers to square feet criteria and general use of prewired workstations and systems furniture require MAJCOM approval.

SECTION 6 ACCOMPLISHMENT

6.1 Layout, design, specification, technical evaluation and final approval of all workstations and furnishings should be accomplished by a qualified designer or a systems furniture space planner. For MILCON projects the designer will normally be part of the Architect-Engineer design contract or designed in-house by the agent. For O&M projects the designer may be in-house or contracted.

6.2 When selecting a design firm, the following factors should be considered with respect to the firms ability to provide complete interior design services.

6.2.1 Experience in space planning, functional analysis design, specification writing and experience commensurate with the project for which they are being considered.

6.2.2 Previous government design and knowledge of the furniture procurement process.

6.2.3 Experience with workstations products and technical requirements required in analyzing, developing and evaluating products that meet the users needs.

SECTION 7 DESIGN

7.1 Guide Specifications contained in ETL 88-10: Prewired Workstations, 29 December 88 and ETL 89-04: Systems Furniture, 6 Jul 89 are to be used when developing generic specifications which include all of the technical and functional criteria to meet the user needs.

7.2 Criteria

7.2.1 Use workstations to the greatest extent possible. Panel heights are available in floor to ceiling height partitions and should be used when enclosed offices, conference areas, break rooms, etc are required. The use of permanent floor to ceiling partitions for traditional offices must be justified in the project documents.

7.2.2 Manned workstations shall be a minimum of 56 square feet of floor area in order to provide flexibility, accommodate future changes and maintain employee health and moral.

7.2.3 Unmanned workstations used by personnel on a temporary basis should be a minimum size of 36 square feet of floor area.

7.3 Storage Requirements

7.3.1 Determine documentation storage requirements for administrative areas. If cluster filing or bank storage is determined to best meet the users needs reference AFR 12-20, para. 4-3, Standard Filing Equipment.

7.3.2 Ensure all security requirements are met. If partitions are used in construction of conference areas, reference AFP 88-26, Construction of Security Conference rooms.

7.4 Flooring

7.4.1 Carpet

Carpet tiles should be used as the finish flooring in all administrative areas.. They are to be installed IAW the manufacturer's recommended method. Special attention should be given to static level threshold for electronic equipment sensitive areas. Refer to AFM 88-15, Criteria and Standards for Air Force Construction, for carpet construction guidance.

7.4.2 Raised Flooring

For data processing facilities refer to AFM 88-1, Chapter 9, Raised Floor Systems for requirements. Carpet tiles or resilient flooring must be used.

7.4.3 Resilient Flooring

Resilient flooring may be used in conjunction with workstations only in industrial areas, laboratories, maintenance areas, etc.

7.5 Electrical/Communications

7.5.1 The facility's electrical power and communications must be designed to support workstations. Ceiling access, underfloor raceways or flat cable (power only, for use in renovation projects) may be used to distribute power and/or communications from the building systems to the workstation locations.

7.5.2 Recommended lighting levels for worksurfaces should be a minimum of 50 footcandles.

7.5.3 Task and ambient lighting connected to the workstations should be used to the maximum extent. It can reduce total energy requirements for lighting and air conditioning.

7.6 Mechanical Systems

Heating and mechanical systems will be effected when using workstations. Mechanical systems should be designed to have continuous air circulation regardless of how workstations are configured.

7.7 Acoustics

Acoustical considerations (walls, ceilings, floors, etc) will be considered for all facilities. Particular attention should be for those areas that have advance communication (STU-III telephones, etc.) or security requirements. White noise masking systems should be considered for all administrative areas.

7.8 Tempest

Specify, if required, all requirements and identify responsibilities for installation. Reference ETL guide specifications for additional tempest details.

7.9 Layouts

The arrangement of workstations shall satisfy all life safety criteria as defined by AFR 88-15 and the National Fire Protection Association Life Safety Codes Reference ETL Guide Specifications for details.

SECTION 8 ACQUISITION

8.1 Prewired workstations are purchased through the construction contract and must meet technical specifications and user needs.

8.2 Systems furniture may be purchased through the construction contract or through the supply system from an approved federal source. Both processes must meet technical specification and user needs.

8.3 Add-ons to workstations are to match or be compatible with the existing items and should be purchased through the supply system or through the construction contract.

SECTION 9 ACQUISITION APPROVAL

9.0 All initial and add-on projects require MAJCOM approval. Check with your MAJCOM for approval submittal requirements prior to starting the project.

SECTION 10 RESPONSIBILITIES

10.1 Base Civil Engineer (BCE)

10.1.1 Identify requirements with user, includes workstation and facility modification/renovation requirements.

10.1.2 Ensure users needs are meet.

10.1.3 MILCON: Work with MAJCOM and AFRCE to ensure all requirements are meet.

10.1.4 O&M: Prepare design and acquisition package for MAJCOM approval. Work with user and contracting to procure workstations.

10.1.5 O&M & MILCON: Retain design & procurement documentation per AFR 20-14 for accountability. Necessary to support audits.

10.1.6 Provide the user with a list of all workstation items included in the facility upon acceptance of the project.

10.2 User

10.2.1 Identify all requirements to BCE.

10.2.2 Maintain, modify, repair, replace and add-on to existing workstations to meet their needs in accordance with AFR 20-11.

10.2.3 Obtain Civil Engineering approval prior to acquiring or modifying workstations.

10.2.4 Obtain funding O&M or NAF funds for all projects to pay for design, acquisition and installation.

10.2.5 Provide BCE with documentation for all repair, replacement or add-ons to the initial project.

10.2.6 Ensure all workstations and components remain within the facility, unless otherwise approved by the BCE.

10.3 MAJCOM

10.3.1 Review and approve all projects. Issue MAJCOM directives as necessary to ensure compliance with this policy.

10.3.2 Maintain files within the Programming, Design and Construction (PDC) information system.

10.4 Design Manager

10.4.1 Will ensure that the MAJCOM directives, review comments, unique criteria, design elements and furnishings, requirements are incorporated into the project.

10.4.2 Maintain files within the PDC information system.

10.4.3 Insure all documents are prepared, meet all user requirements for acquisition of workstations.

10.5 Construction Contractor: When workstations are purchased through the construction contractor, the contractor is responsible for providing submittals that meet the technical specifications for approval prior to installation. Additional contractor responsibilities are explained in the ETL Guide specifications.

SECTION 11 INSTALLATION

11.1 MILCON: Through the construction contractor.

11.2 O&M: Through the construction contractor and/or by the manufacturer, or his representative.

PART 12 ACCEPTANCE

12.1 All workstations will be accepted as part of the final inspection and acceptance of the facility, if included in construction contract.

12.2 All workstations must meet the technical specifications.

12.3 All layouts and products must meet fire and life safety criteria.

WORKSTATION ITEMS

Listed below are some of the general, but not limited to, items that are used to configure a complete and usable workstation and its supporting elements.

1. Panels

   a. Acoustical
   b. Powered/nonpowered
   c. Connecting hardware

2. Components

   a. Work surfaces
   b. Drawers
   c. Shelves
      (1) with doors
      (2) without doors
   d. Files
      (1) Lateral (panel hung)
      (2) Bins
   e. Task lights/special purpose lighting/ambient lighting
   f. Counter tops/transaction counters
   g. Specialized surfaces (drafting, chemically treated, antistatic, etc)

3. Accessories

   a. Tackboards
   b. Locks
   c. Shelf dividers
   d. Paper flow devices
   e. Marker boards
   f. Computer turntables
   g. Coat racks
   h. Wire guide
   i. Coat hooks
   j. Display panel hooks
   k. Adjustable keyboards

4. Signage

   a. Organization identification signs
   b. Name signs at workstations

5. Chairs - Ergonomic

   a. With arms
   b. Without arms

PREWIRED WORKSTATION/SYSTEMS FURNITURE

OVERVIEW

	MILCON	O&M	NAF
Accountability	BCE	BCE	USER
Responsibility	USER	USER	USER
Maintenance	USER	USER	USER
Replacement	USER	USER	USER
Pkg. Preparation	Design Manager	USER/BCE	USER/BCE
Pkg. Approval	MAJCOM/DEE	MAJCOM/DEE	MAJCON/DEE
Funding	MILCON 3300	O&M 3400	NAF/USER
Acquisition	Construction Contract	Cons Cont/ Supply	Cons Cont/ Supply
CID	Required	Optional/ Recommended	Optional/ Recommended

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
82-2	Energy Efficient Equipment	10 Nov 82
83-1	Design of Control Systems for HVAC	16 Feb 83
	Change No. 1 to ETL 83-1, U.S. Air Force Standardized Heating, Ventilating & Air Conditioning (HVAC) Control Systems	22 Jul 87
83-3	Interior Wiring Systems, AFM 88-15, Para 7-3	2 Mar 83
83-4	EMCS Data Transmission Media (DTM) Considerations	3 Apr 83
83-7	Plumbing, AFM 88-8, Chapter 4	30 Aug 83
83-8	Use of Air-to-Air Unitary Heat Pumps	15 Sep 83
83-9	Insulation	14 Nov 83
84-2	Computer Energy Analysis	27 Mar 84
	Change 1 Ref: HQ USAF/LEEEU Msg 031600Z May 84	1 Jun 84
84-7	MCP Energy Conservation Investment Program (ECIP)	13 Jun 84
84-10	Air Force Building Construction and the Use of Termiticides	1 Aug 84
86-2	Energy Management and Control Systems (EMCS)	5 Feb 86
86-4	Paints and Protective Coatings	12 May 86
86-5	Fuels Use Criteria for Air Force Construction	22 May 86
86-8	Aqueous Film Forming Foam Waste Discharge Retention and Disposal	4 Jun 86
86-9	Lodging Facility Design Guide	4 Jun 86
86-10	Antiterrorism Planning and Design Guidance	13 Jun 86
86-14	Solar Applications	15 Oct 86
86-16	Direct Digital Control Heating, Ventilation and Air Conditioning Systems	9 Dec 86
87-1	Lead Ban Requirements of Drinking Water	15 Jan 87
87-2	Volatile Organic Compounds	4 Mar 87
87-4	Energy Budget Figures (EBFs) for Facilities in the Military Construction Program	13 Mar 87
87-5	Utility Meters in New and Renovated Facilities	13 Jul 87
87-9	Prewiring	21 Oct 87

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
88-2	Photovoltaic Applications	21 Jan 88
88-3	Design Standards for Critical Facilities	15 Jun 88
88-4	Reliability & Maintainability (R&M) Design Checklist	24 Jun 88
88-5	Cathodic Protection	2 Aug 88
88-6	Heat Distribution Systems Outside of Buildings	1 Aug 88
88-7	TEMPEST & High Altitude Electromagnetic Pulse (HEMP) Protection for Facilities	24 Aug 88
88-8	Chlorofluorocarbon (CFC) Limitation in Heating, Ventilating and Air-Conditioning (HVAC) Systems	4 Oct 88
88-9	Radon Reduction in New Facility Construction	7 Oct 88
88-10	Prewired Workstations Guide Specification	29 Dec 88
89-1	1988 Energy Prices and Discount Factors for Life-Cycle Cost Analysis	6 Feb 89
89-2	Standard Guidelines for Submission of Facility Operating and Maintenance Manuals	23 May 89
89-3	Facility Fire Protection Criteria for Electronic Equipment Installations	9 Jun 89
89-4	Systems Furniture Guide Specification	6 Jul 89
89-5	Air Force Interior Design Policy	not yet
89-6	Power Conditioning and Continuation Interfacing Equipment (PCCIE) in the Military Construction Program (MCP)	7 Sep 89
89-7	Design of Air Force Courtrooms	29 Sep 89
90-1	Built-Up Roof (BUR) Repair/Replacement Guide Specification	23 Jan 90
90-2	General Policy for Prewired Workstations and Systems Furniture	26 Jan 90

No.	Date	Status
82-1	10 Nov 82	Superseded by ETL 83-10, 86-1, 87-4
82-3	10 Nov 82	Superseded by ETL 83-5, 84-2
82-4	10 Nov 82	Superseded by ETL 84-7
82-5	10 Nov 82	Superseded by ETL 84-1, 86-13, 86-14
82-6	30 Dec 82	Cancelled
82-7	30 Nov 82	Cancelled
83-2	16 Feb 83	Superseded by ETL 84-3
83-6	24 May 83	Cancelled
84-3	21 Mar 84	Cancelled
84-4	10 Apr 84	Superseded by ETL 86-7, 86-15, 87-5
84-5	7 May 84	Superseded by ETL 84-8, 86-11, 86-18, 8
84-6	Not Issued	Cancelled/Not Used
84-9	5 Jul 84	Superseded by ETL 88-7
86-3	21 Feb 86	Superseded by ETL 86-4
86-6	3 Jun 86	Superseded by ETL 86-11, 86-18, 88-6
86-12	3 Jul 86	Superseded by ETL 90-2
86-17	17 Dec 86	Superseded by ETL 89-6
87-3	12 Mar 87	Superseded by ETL 87-6, 88-5
87-7	14 Oct 87	Superseded by ETL 89-1
Change 1	30 Dec 87	Superseded by ETL 89-1
87-8	19 Oct 87	Superseded by ETL 90-1
88-1	05 Jan 88	Superseded by ETL 89-2